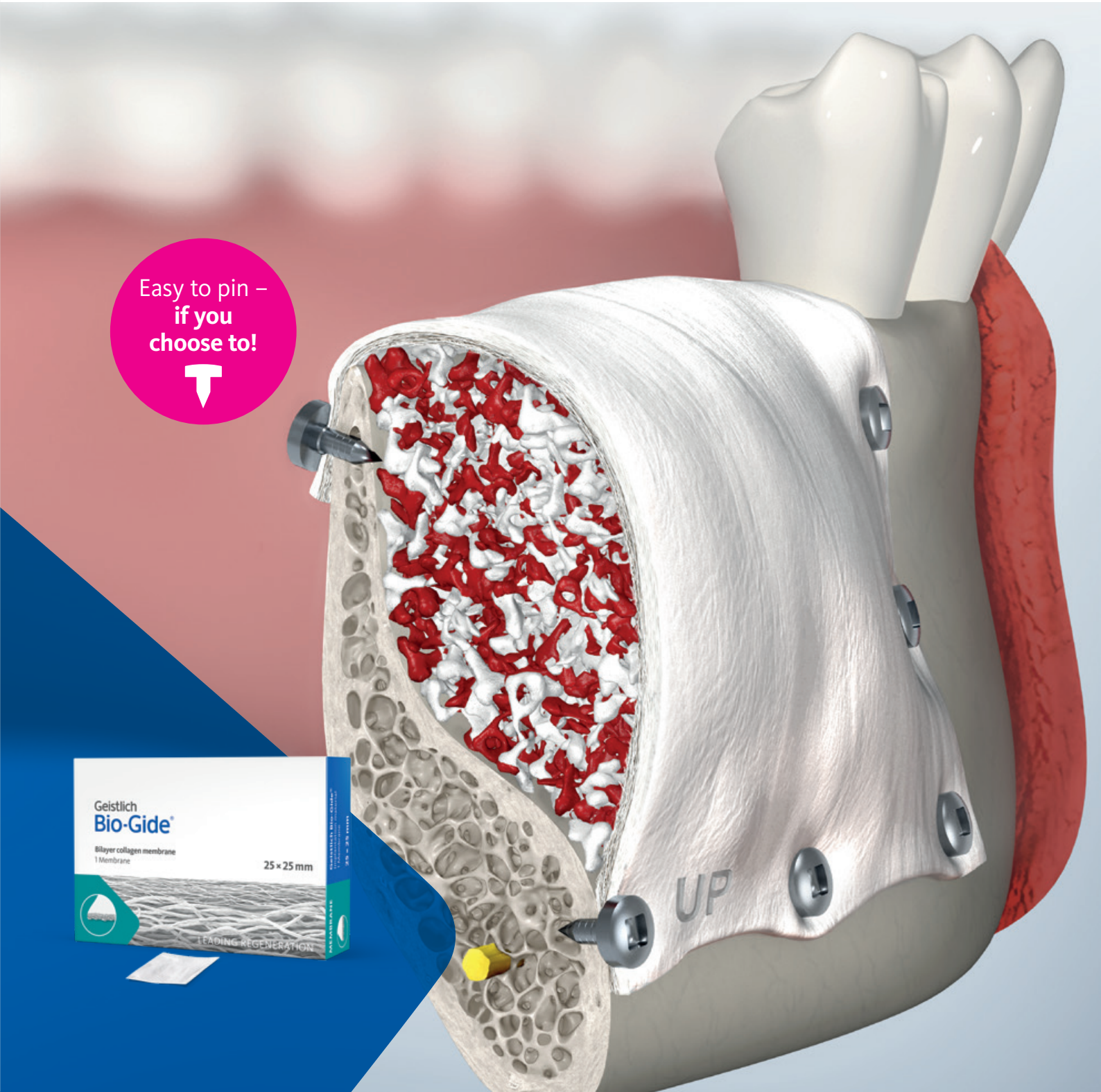
LEADING REGENERATION

Geistlich
Biomaterials

Geistlich Bio-Gide® in the Sausage Technique™



Geistlich
THE COLLAGEN EXPERT



Prof. Francis Hughes,
London (United Kingdom)

Not all membranes are the same: take a closer look

Prof Hughes and co-workers investigated the interaction of collagen membranes with bone forming cells.

Can you give us a little bit background on your current role and research interests?
Our current work is about the control of bone forming cells; both what makes them make bone but particularly how the soft-tissues interact with the hard-tissue to prevent the formation.

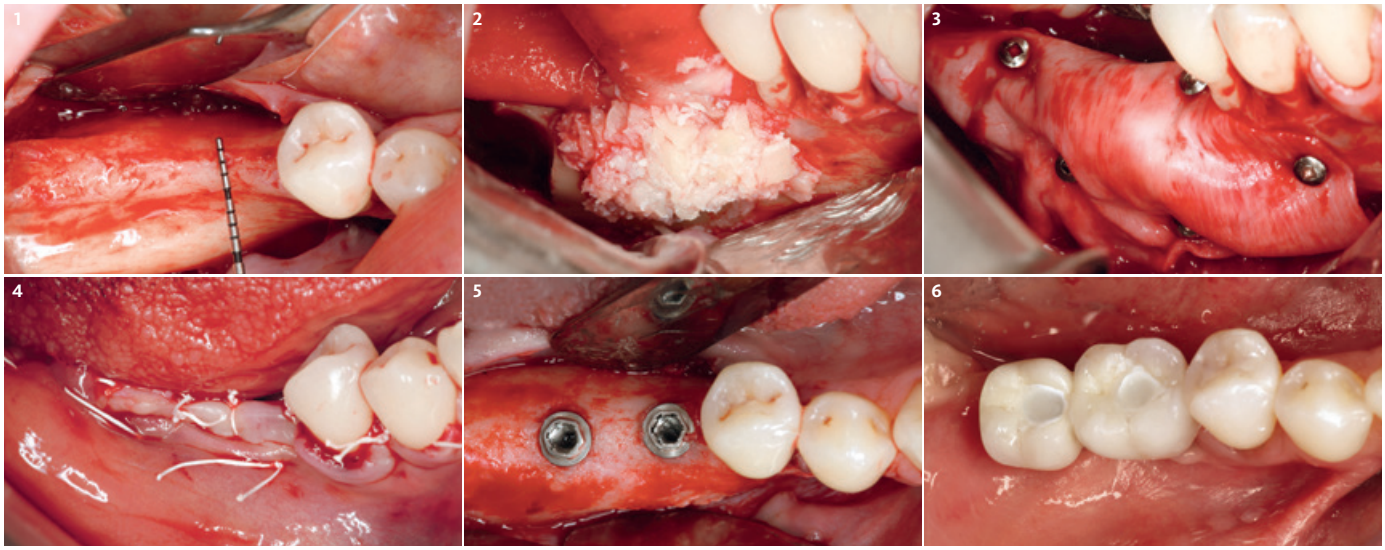
What did the data show?
Osteopontin was particularly interesting. The actual data showing the up-regulation of osteopontin on the Geistlich Bio-Gide® membrane is very impressive.

View online:
Complete lecture on **"NEW APPROACHES IN BONE AND TISSUE REGENERATION"**
by Prof. Francis Hughes

Your surgical expertise



Clinical case by Prof. Istvan Urban | Budapest (Hungary)



1 Occlusal view of severely atrophied posterior mandibular ridge. Full thickness flap is opened using a mid-crestal incision plus two divergent vertical incisions.

2 Buccal view after application of 1:1 mixture of autogenous particulated bone and Geistlich Bio-Oss® granules. The Geistlich Bio-Gide® membrane is secured on the crest before the application of the graft.

3 Buccal view of a single Geistlich Bio-Gide® membrane, which is fixed with titanium pins. The fixed membrane immobilizes the bone graft creating the sausage skin effect.

4 A periosteal releasing incision connects the two vertical incisions achieving enough flap elasticity. The flap is then sutured in two layers using horizontal mattress sutures and single interrupted sutures.

5 Occlusal view of the regenerated ridge at re-entry after 7 months. Two implants were placed with good primary stability. Note the excellent incorporation of the Geistlich Bio-Oss® with the autograft.

6 Final outcome 2 years after implant loading.

Ask your local Geistlich contact person for the detailed Indication Sheet.

Please note: The use of pins is part of the displayed surgical technique. In the great majority of surgical procedures fixing Geistlich Bio-Gide® with pins is not needed.
Pins used: Meisinger

Key to success – Our expert membrane

Combining winning factors available is the key to success. Your surgical expertise is supported by the material excellence provided by Geistlich Bio-Gide®:
The carefully preserved native bilayer structure of Geistlich Bio-Gide® supports reliable bone regeneration.[1] Due to its good adhesive properties Geistlich Bio-Gide® does not need additional fixing in most applications.[2]

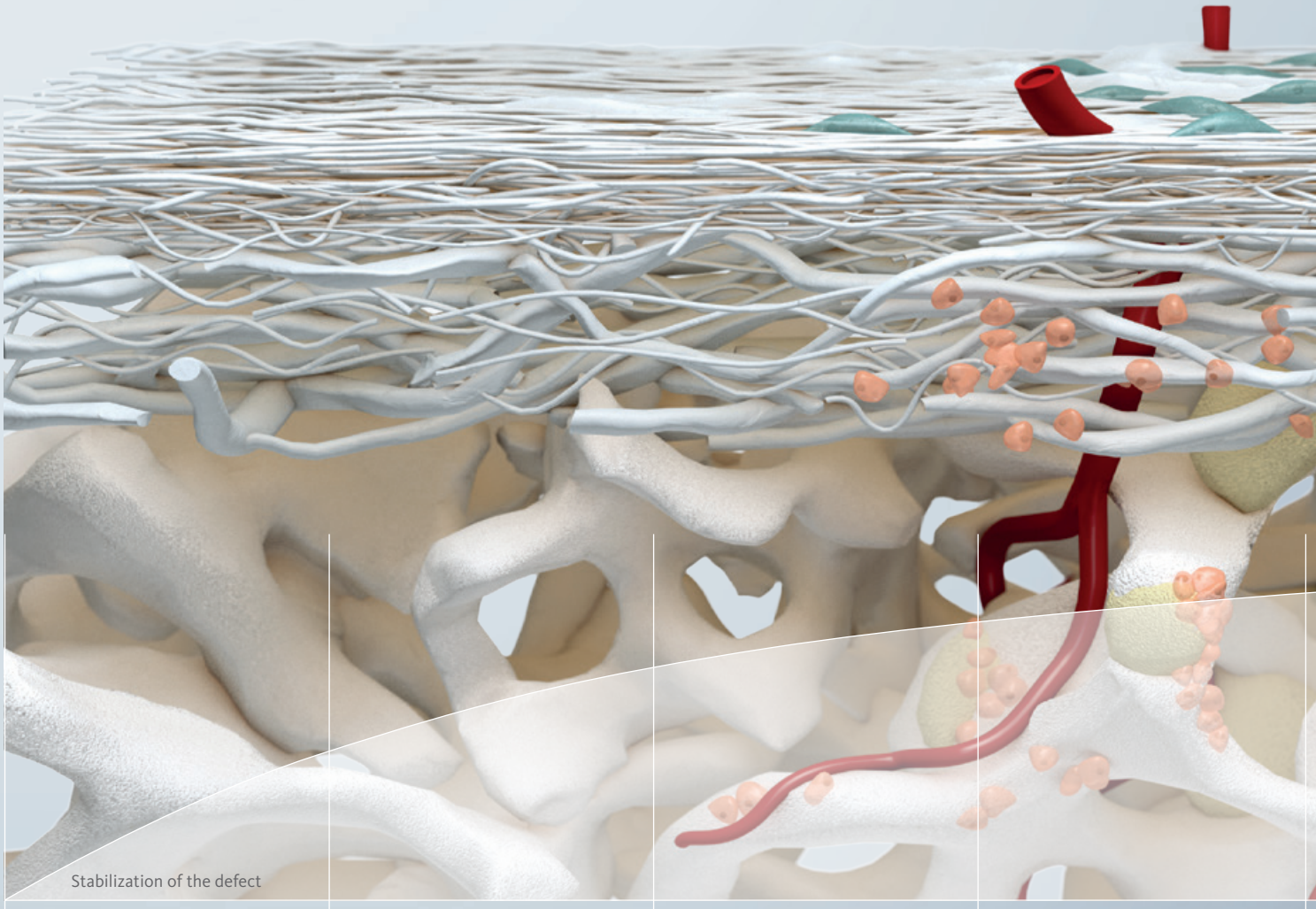
Its flexibility enables the surgeon to create a mechanically stable augmentation area.[3] The good liquid uptake of Geistlich Bio-Gide® ensures that growth factors and nutrients from the blood are taken up.[4] The membrane effectively protects the graft by protects the grafted area from both, ingrowth of soft-tissue[5] and mechanical dislocation.[6] Geistlich Bio-Gide®'s outstanding biofunctionality[7,8] ensures high therapy safety even in case of dehiscence.[5,9]

Native bilayer structure[11]	non-native	native
Suture pull-out[2]	0N*	10N*
Elongation[2]	0%	60%
Liquid uptake[4]	0 wet(mg)/dry(mg)	7 wet(mg)/dry(mg)
Fibroblast proliferation[12]	0 cells/mm²	70 cells/mm²
Osteoblast proliferation[12]	0 cells/mm²	100 cells/mm²

* In vitro tests in pig mucosa document a mean breaking force of 10N.[16]

Level of achievement of Geistlich Bio-Gide®
difference to given max

Handing over to nature



0 days

Grafting – strong foundation
The bony defect is grafted with Geistlich Bio-Oss® and covered with Geistlich Bio-Gide®. Bleeding ends and hemostasis is initiated.

The unique bilayer structure of Geistlich Bio-Gide® comprises a smooth and a rough, open-pored layer.
Due to its porous structure and high hydrophilicity Geistlich Bio-Gide® takes up the blood quickly including growth factors and nutrients.[4]

1 day

Coagulum – first stabilization
Via coagulation the blood clots. A fibrin network forms within 24 hours to stop blood from running. It is essential that the coagulum remains stable.[13] This enables the structure of the regenerating tissue to adapt to the surrounding tissue.

Geistlich Bio-Gide® stabilizes the grafted area, protecting bone particles from dislocation.[6]
At the same time Geistlich Bio-Gide® separates soft- and hard-tissue.[5]
Geistlich Bio-Gide® protects the blood clot.[13]

2–7 days

Proliferation – re-integration
Early proliferative phase is characterized by the formation of blood vessels to ensure oxygen supply. During approximately seven days the coagulum is replaced by granulation tissue.[14] Epithelial proliferation begins from the margins of the wound. Granulation and connective tissue are present after 7 days[14] and the formation of osteoid matrix is underway.

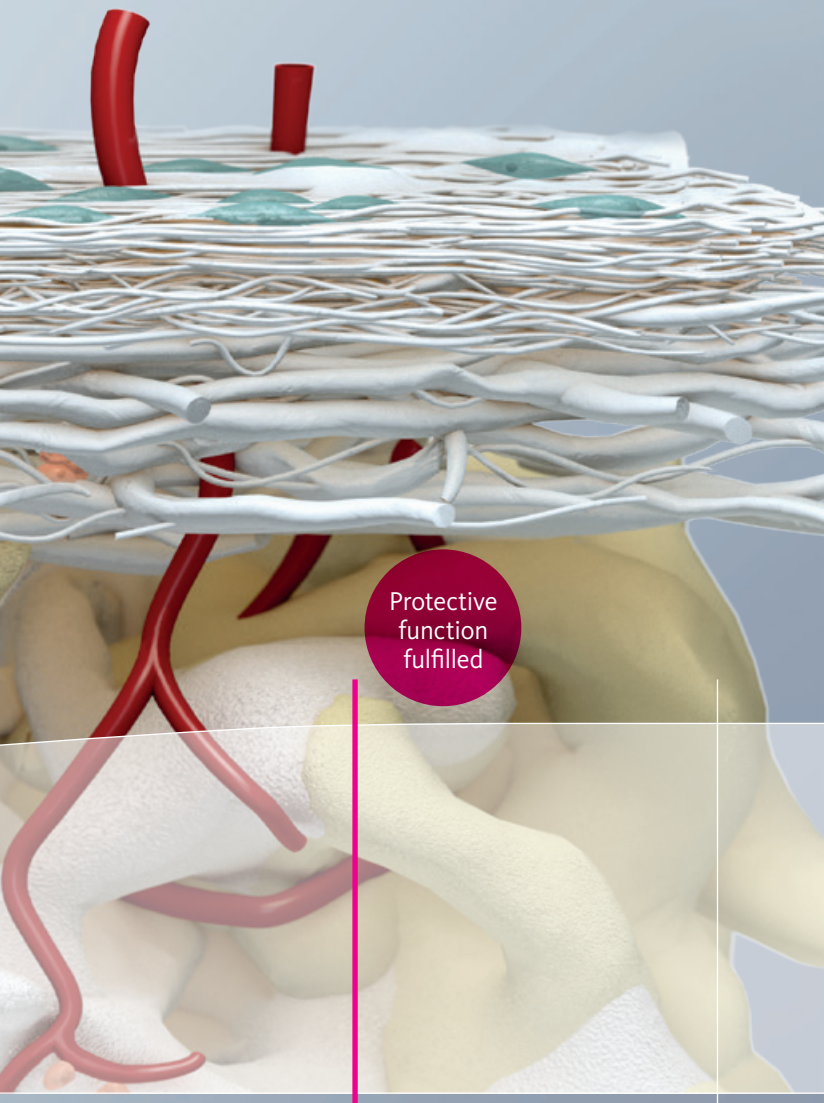
New blood vessel formation occurs not only adjacent to the bone defect but also directly underneath Geistlich Bio-Gide® due to its early and complete vascularization.[13]

1–2 weeks

Remodelling – active osteoblasts
Remodeling phase starts after 1–2 weeks centripetal from the residual walls along the vascular structures.[14] Osteoblasts continue to deposit osteoid matrix and start mineralization.

The rough membrane layer, facing the bony part of the defect, enables osteoblast growth. [12]

Gain a more detailed insight into guided bone regeneration in the movie
“Cell to cell communication: Guided Bone Regeneration”
https://www.youtube.com/watch?v=kTmP6hFOBuU



4–12 weeks

Corticalization – stable scaffold
Bone formed from woven fibres occupies almost the whole defect volume prior to corticalization. After 2–3 months the tissue has been gradually replaced by lamellar bone and bone marrow.[14] The structure is fairly stable although the bone is not yet mature.

The protective function of the Geistlich Bio-Gide® membrane is fulfilled. It assisted the natural healing process long enough: The regenerating areas are pre-determined for their desired function and will develop accordingly.

Until 6 months

Maturation – final stability
Maturation of the bony trabeculae continues until they are adapted to the structure of the surrounding tissue.[14] Additionally the new bone as well as residual graft particles are subjected to continuous remodelling processes.

Temporary barrier instead of unnecessary blockade
Once the protective function of Geistlich Bio-Gide® has been fulfilled the membrane resorbs. The natural complex structures of the soft-tissue, with all the intrinsic components such as the periosteum are formed.[15]

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swiss made

Geistlich Bio-Oss®

Small granules (0.25–1 mm) | Quantities:
0.25 g, 0.5 g, 1.0 g, 2.0 g (1 g ~ 2.05 cm^3)

Large granules (1–2 mm) | Quantities:
0.5 g, 1.0 g, 2.0 g (1 g ~ 3.13 cm^3)



Geistlich Bio-Gide®

Sizes: 25 × 25 mm, 30 × 40 mm



Geistlich Bio-Gide® Compressed

Sizes: 13 × 25 mm, 20 × 30 mm



Geistlich Bio-Gide® Shape

Size: 14 × 24 mm



Geistlich Bio-Gide® Perio

Size: 16 × 22 mm



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